Clinical significance of detecting CEA, CA199, AFP, HCG, CA153, CA125 in postoperative treatment of patients with ovarian cancer

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Objective: To explore the clinical significance of carcinoembryonic antigen (CEA), carbohydrate antigen 199 (CA199), a tire protein (AFP), human chorionic gonadotropin (HCG), carbohydrate antigen 153 (CA153) and carbohydrate antigen 125 (CA125) in the postoperative treatment of patients with ovarian cancer.

Methods: 210 cases of patients with ovarian cancer after initial treatment from January 2015 to December 2015, 232 cases of patients with ovarian benign tumor and 250 cases of healthy women were selected, CEA, CA199, AFP, HCG, CA153 and CA125 levels were detected, and the levels after chemotherapy in patients with ovarian carcinoma were detected.

Results: CEA, CA199, AFP, HCG, CA153 and CA125 levels in patients with ovarian cancer were (12.37±7.43) ng/mL, (84.04±26.96) U/mL, (37.46±9.47) μg/L, (110.54±35.51) IU/L, (51.23±9.20) U/mL and (64.36±42.68) U/mL, respectively, which were significantly higher than that in normal controls and patients with benign ovarian lesions, and were considered to be statistically significant. Chemotherapy after two cycles, CEA, CA199, AFP, HCG, CA153 and CA125 levels in patients with ovarian cancer were significantly lower than that before chemotherapy, and were considered to be statistically different. Chemotherapy after four cycles, CEA, CA199, AFP, HCG, CA153 and CA125 levels in patients with ovarian cancer continue to decrease, and were significantly lower than that of chemotherapy after two cycles, and had statistical differences.

Conclusion: CEA, CA199, AFP, HCG, CA153 and CA125 can be used as important indicators for monitoring the chemotherapy effects, early recurrence and metastasis of ovarian cancer.

1. Introduction

Ovarian cancer is a common gynecologic malignant tumor, due to its high metastasis and recurrence rate, the treatment process is very long and needs repeatedly chemotherapy and radiotherapy, it brings great suffering to patients and significantly increases the burden of disease[1-4]. It is important to search effective tumor markers for monitoring the effect of chemotherapy, early recurrence and metastasis. In this study, to explore the effects of tumor markers for monitoring the effect of chemotherapy, early recurrence and metastasis, carcinoembryonic antigen (CEA), carbohydrate antigen 199 (CA199), a tire protein (AFP), human chorionic gonadotropin (HCG), carbohydrate antigen 153 (CA153) and carbohydrate antigen 125 (CA125) were detected, which provided theoretical basis for clinical diagnosis and treatment.

2. Clinical data and methods

2.1. General data

A total of 210 cases of patients with ovarian cancer after initial treatment from January 2015 to December 2015 in Shengjing Hospital of China Medical University were selected, their average ages were (47.21±7.84) years, and they were composed of 172 cases of patients with serous ovarian cancer (81.90%) and 38 cases of patients with mucous ovarian cancer (18.10%). They were treated by stages according to the FIGO standard in 2000[5], 23 cases of patients were in Ⅰ stage (10.95%), 121 cases of patients...
were in II stage (57.62%), and 66 cases of patients were in III stage (31.43%). Inclusion criteria: 1) ages from 20 to 75 years, 2) all patients have been diagnosed with ovarian cancer by histologic examination, and the pathological types were serous ovarian cancer or mucous ovarian cancer, 3) pathological stages were under IV stage, 4) adopted by radical operation of ovary cancer, 5) all patients have signed informed consent and have no contraindications to chemotherapy, chemotherapy begins after ovarian cancer radical surgery for three weeks, the same chemotherapy scheme is used and four cycles of chemotherapy should be completed, 6) KPS score is conducted before chemotherapy and the scores are all over 90 points, 7) have no insufficiency, lesion and serious infection of heart, lung, stomach, brain, liver and renal, 8) the survival time is estimated and more than four months. Rule out the patients who neither meet the inclusion criteria nor cooperate this research. 232 cases of patients with ovarian benign tumor during the same period in department of gynecology in our hospital were selected as ovarian benign lesions group, the average ages were (46.87±6.51) years, 250 cases of healthy women were selected as control group, the average ages were (46.32±6.97) years.

2.2. Therapeutic methods

Chemotherapy treatment of patients with ovarian cancer was conducted as follows, 175 mg/m$^2$ paclitaxel were injected by intravenous drip in the first day, paraplatin AUC 4-5 was injected by intravenous drip in the second day, every 21 d were set as a treatment cycle and four cycles of chemotherapy were conducted.

2.3. Methods of sample collection and detection

5 mL of fasting peripheral venous blood in all objects were collected by EDTA plain tubes before chemotherapy, fasting blood-glucose (FPG), hemoglobin A1C (HbA1c), triglyceride (TG), total cholesterol (TCH), high density lipoprotein cholesterol (HDL-C) and low density lipoprotein cholesterol (LDL-C) were detected, FPG was detected by glucose oxidase membrane electrode method, HbA1c was detected by glycosylation hemoglobin kit and Sysmex GT, TG, TCH, HDL-C and LDL-C were detected by enzymic method using Vitros-350 fully automatic biochemical analyser.

5 mL of fasting peripheral venous blood in patients with ovarian cancer before chemotherapy, after two cycles of chemotherapy and after four cycles of chemotherapy were collected by EDTA plain tubes, respectively, serum was isolated, CEA, CA199, AFP, HCG, CA153 and CA125 levels were detected by protein chip detection system (C12) of multiple tumor markers, which was produced by Shanghai Shukang biological technology co., LTD. Reference ranges of normal values were CEA<5.00 ng/mL, CA199<37.00 U/mL, AFP<25.00 μg/L, HCG<100.00 IU/L, CA153<35.00 U/mL, CA125<35.00 U/mL.

2.4. Physical examination

The measurement of systolic pressure, diastolic blood pressure and BMI were conducted for all the research objects.

2.5. Statistical analysis

Survey data were entered by Epi Data 3.0 software, SPSS 20.0 statistical package was conducted for statistical analysis after check. Measurement data were described as mean ± standard deviation (Mean ± SD) with variance analysis, pairwise comparison was conducted by analysis of variance and SNK test, Values of $P<0.05$ were considered to be statistically significant.

3. Results

3.1. Comparison of CEA, CA199, AFP, HCG, CA153 and CA125 in three groups

The comparison of CEA, CA199, AFP, HCG, CA153 and CA125 levels in ovarian cancer group were significantly higher than that in control group and ovarian benign lesion group, and it was considered to be statistically significant ($P<0.05$). CEA, CA199, AFP, HCG, CA153 and CA125 levels in ovarian cancer group were significantly higher than that in control group and ovarian benign lesion group, and it was considered to be statistically significant ($P<0.05$). CEA, CA199, AFP, HCG, CA153 and CA125 levels in ovarian cancer group were significantly higher than that in control group and ovarian benign lesion group, and it was considered to be statistically significant ($P<0.05$). CEA, CA199, AFP, HCG, CA153 and CA125 levels in ovarian cancer group were significantly higher than that in control group and ovarian benign lesion group, and it was considered to be statistically significant ($P<0.05$). CEA, CA199, AFP, HCG, CA153 and CA125 levels in ovarian cancer group were significantly higher than that in control group and ovarian benign lesion group, and it was considered to be statistically significant ($P<0.05$). CEA, CA199, AFP, HCG, CA153 and CA125 levels in ovarian cancer group were significantly higher than that in control group and ovarian benign lesion group, and it was considered to be statistically significant ($P<0.05$). CEA, CA199, AFP, HCG, CA153 and CA125 levels in ovarian cancer group were significantly higher than that in control group and ovarian benign lesion group, and it was considered to be statistically significant ($P<0.05$). CEA, CA199, AFP, HCG, CA153 and CA125 levels in ovarian cancer group were significantly higher than that in control group and ovarian benign lesion group, and it was considered to be statistically significant ($P<0.05$). CEA, CA199, AFP, HCG, CA153 and CA125 levels in ovarian cancer group were significantly higher than that in control group and ovarian benign lesion group, and it was considered to be statistically significant ($P<0.05$). CEA, CA199, AFP, HCG, CA153 and CA125 levels in ovarian cancer group were significantly higher than that in control group and ovarian benign lesion group, and it was considered to be statistically significant ($P<0.05$). CEA, CA199, AFP, HCG, CA153 and CA125 levels in ovarian cancer group were significantly higher than that in control group and ovarian benign lesion group, and it was considered to be statistically significant ($P<0.05$).

3.2. Comparison of CEA, CA199, AFP, HCG, CA153 and CA125 in ovarian cancer group before treatment, after two cycles of chemotherapy and after four cycles of chemotherapy

<table>
<thead>
<tr>
<th>Factors</th>
<th>n</th>
<th>CEA (ng/mL)</th>
<th>CA199 (U/mL)</th>
<th>AFP (μg/L)</th>
<th>HCG (IU/L)</th>
<th>CA153 (U/mL)</th>
<th>CA125 (U/mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>250</td>
<td>1.56±0.89</td>
<td>10.23±3.55</td>
<td>3.62±2.41</td>
<td>10.84±2.56</td>
<td>8.25±1.88</td>
<td>13.38±2.67</td>
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<td>Ovarian benign lesion</td>
<td>232</td>
<td>2.08±0.94</td>
<td>12.69±4.77</td>
<td>5.75±3.32</td>
<td>13.40±5.83</td>
<td>11.27±5.46</td>
<td>16.52±6.78</td>
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<td>Ovarian cancer</td>
<td>210</td>
<td>12.37±7.43</td>
<td>84.04±26.96</td>
<td>37.46±9.47</td>
<td>110.54±35.51</td>
<td>51.23±9.20</td>
<td>64.36±42.68</td>
</tr>
<tr>
<td>F</td>
<td></td>
<td>471.569</td>
<td>1391.486</td>
<td>1857.21</td>
<td>1642.801</td>
<td>3239.269</td>
<td>290.898</td>
</tr>
<tr>
<td>P</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Note: compared with control group, *$P<0.05$; compared with ovarian benign lesion group, **$P<0.05$. 

Table 1. Comparison of CEA, CA199, AFP, HCG, CA153 and CA125 in three groups.
The comparison of CEA, CA199, AFP, HCG, CA153 and CA125 in ovarian cancer group before treatment, after two cycles of chemotherapy and after four cycles of chemotherapy were conducted in this study, CEA, CA199, AFP, HCG, CA153 and CA125 levels in ovarian cancer group after two cycles of chemotherapy were significantly lower than that before treatment, and it was considered to be statistically significant (P<0.05). After four cycles of chemotherapy, CEA, CA199, AFP, HCG, CA153 and CA125 levels in ovarian cancer continue to decrease, which were significantly lower than that after two cycles of chemotherapy, and it was considered to be statistically significant (P<0.05). See Table 2.

4. Discussion

Tumor markers are usually produced by tumor tissue metabolism, or as metabolites produced by body’s metabolic reactions due to stimulation of tumor cells, it is a kind of chemical substance reflecting the malignant tumor, which could not be found in normal adult tissues except for embryonic organization, whose contents in malignant tumors were significantly higher than that in normal tissue(6–9). In this study, to explore the effects of tumor markers for monitoring the effect of chemotherapy, early recurrence and metastasis, CEA, CA199, AFP, HCG, CA153 and CA125 were detected, which could provide theoretical basis for clinical diagnosis and treatment.

CEA is one of the most used tumor markers in clinical application at present, it has important diagnostic value for gynecology malignant tumor, breast cancer, lung cancer, liver cancer and other digestive system malignant tumors(10–12). CA199 is a glucolipid on the cell membrane and a kind of mucin tumor markers, its molecular weight is more than 1 000 kD, it exists in blood serum in the form of the cell membrane and a kind of mucin tumor markers, its molecular weight is more than 1 000 kD, it exists in blood serum in the form of epithelium of normal adults, which is a related antigen exists in the blood of normal fetus and pancreas and bile duct epithelium, in patients with ovarian cancer, its positive rate was far lower than the that of malignant tumors, therefore, abnormal elevated levels of CEA, CA199, AFP, HCG, CA153 and CA125 in ovarian cancer could determine whether postoperative recurrence.

The comparison of CEA, CA199, AFP, HCG, CA153 and CA125 in ovarian cancer group before treatment, after two cycles of chemotherapy and after four cycles of chemotherapy were conducted in this study, CEA, CA199, AFP, HCG, CA153 and CA125 levels in ovarian cancer group after two cycles of chemotherapy were significantly lower than that before treatment, and it was considered to be statistically significant (P<0.05). After four cycles of chemotherapy, CEA, CA199, AFP, HCG, CA153 and CA125 levels in ovarian cancer continue to decrease, which were significantly lower than that after two cycles of chemotherapy, and it was considered to be statistically significant (P<0.05). The results were consistent with that of Kondalsamy et al(20), who obtained the similar conclusion by analyzing the postoperative changes of tumor markers in patients with ovarian cancer, therefore, monitoring and analyzing CEA, CA199, AFP, HCG, CA153 and CA125 levels in ovarian cancer before treatment contributed to judge the effect of chemotherapy in the treatment of ovarian cancer, early recurrence and metastasis, which could provide reliable theoretical reference for timely and effective treatment of ovarian cancer, and has an important clinical value in judging the progress of this disease(17). CA125 is also a kind of carbohydrate antigen, it has important diagnostic value in ovarian cancer, its level changes could determine chemotherapy regimen, therefore, abnormal elevated levels of CEA, CA199, AFP, HCG, CA153 and CA125 in ovarian cancer group were significantly higher than that in control group and ovarian benign lesion group, and it was considered to be statistically significant (P<0.05). CEA, CA199, AFP, HCG, CA153 and CA125 levels in control group and ovarian benign lesion group were not statistically significant (P>0.05), which were consistent with the results of Wu et al(19), who found that although CEA, CA199, AFP, HCG, CA153 and CA125 levels in ovarian benign tumor, uterine inflammation, endometriosis, liver inflammation increased by combined diagnosis of tumor markers indexes in patients with ovarian cancer, its positive rate was far lower than the that of malignant tumors, therefore, abnormal elevated levels of CEA, CA199, AFP, HCG, CA153 and CA125 contributed to the diagnosis of ovarian cancer and could determine whether postoperative recurrence.

Table 2.
Comparison of CEA, CA199, AFP, HCG, CA153 and CA125 in ovarian cancer group before treatment, after two cycles of chemotherapy and after four cycles of chemotherapy.

<table>
<thead>
<tr>
<th>Factors</th>
<th>CEA (ng/mL)</th>
<th>CA199 (U/mL)</th>
<th>AFP (μg/L)</th>
<th>HCG (IU/L)</th>
<th>CA153 (U/mL)</th>
<th>CA125 (U/mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before treatment</td>
<td>12.57±7.43</td>
<td>84.04±62.96</td>
<td>37.46±9.47</td>
<td>110.54±35.51</td>
<td>51.23±9.20</td>
<td>64.36±42.68</td>
</tr>
<tr>
<td>After two cycles of chemotherapy</td>
<td>8.52±6.62*</td>
<td>54.87±20.18*</td>
<td>28.51±6.84*</td>
<td>87.69±19.57*</td>
<td>39.82±14.81*</td>
<td>37.46±8.53*</td>
</tr>
<tr>
<td>After four cycles of chemotherapy</td>
<td>5.48±2.05**</td>
<td>32.35±4.62**</td>
<td>19.59±3.75**</td>
<td>54.71±13.28**</td>
<td>31.25±4.32**</td>
<td>24.88±3.85**</td>
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<tr>
<td>F</td>
<td>93.017</td>
<td>366.221</td>
<td>334.126</td>
<td>272.654</td>
<td>196.187</td>
<td>134.224</td>
</tr>
</tbody>
</table>

Note: comparison of the same index before treatment, *P<0.05; comparison of the same index after two cycles of chemotherapy, **P<0.05.
diagnosis and treatment of patients with ovarian cancer. In conclusion, CEA, CA199, AFP, HCG, CA153 and CA125 could be used as important indexes for monitoring the chemotherapy efficacy, early recurrence and metastasis of ovarian cancer, therefore, strengthening the monitoring of tumor markers in patients with ovarian cancer could find abnormal and conduct treatment measures as soon as possible to ensure the safety of women's life and health.

References